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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION IV

345 COURTLAND STREET
ATLANTA, GEORGIA 30308

JUN 26 1978

Colonel Adolph A. Hight, USA
District Engineer
Corps of Engineers, Wilmington District
P. O. Box 1890
Wilmington, North Carolina 28402

Dear Colonel Hight:

Region IV of the U. S. Environmental Protection Agency has reviewed the Draft Environmental Impact Statement for Carolina Power and Light Company's Mayo Electric Generating Plant.

Three major areas of concern have been identified in the review of the Impact Statement.

1. Water balance: We have serious reservations about several points in the water balance analysis including evaporative losses, stream flow in Mayo Creek and seepage from the ash pond. Since the water balance as presented is at best marginal, increased evaporation and other losses as indicated herein may prove the project to be infeasible.

2. Ash disposal: Both Virginia and North Carolina have EPA approved water quality standards for Crutchfield Branch. We do not believe that use of the proposed pond for ash disposal is an acceptable use of this stream. An acceptable alternative for ash disposal will be necessary before this project can proceed.

3. Fly ash and bottom ash transport system: Water carriage of fly ash and once-through bottom ash sluicing systems are inconsistent with existing and expected (to be re-proposed in September 1978, with re-promulgation scheduled in March 1979) standards of performance for new sources. It is anticipated that re-promulgated regulations will require dry fly ash handling systems and recirculating bottom ash handling systems. However, even in the absence of such requirements, such systems appear necessary to assure that chronic and acute toxicity conditions do not occur in Mayo Creek, Crutchfield Branch and the make-up water reservoir. In the absence of a commitment to the use of such systems by CP&L, the project appears environmentally unacceptable.

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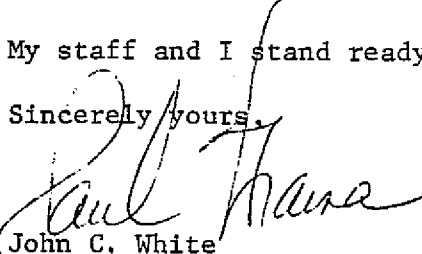
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Colonel Adolph A. Hight

Any one or all of these areas could render the project environmentally unsatisfactory from the standpoint of health, welfare and environmental quality. Details of these and other comments are included in the attached comments.

Based on the project as described in the Draft Environmental Impact Statement, we have assigned a rating of EU (environmentally unsatisfactory) and based on the need for more information as indicated by our review of the DEIS, we have assigned a rating for the Statement of 2 (inadequate information).

My staff and I stand ready to assist you in further developing the EIS.

Sincerely yours,


John C. White
Regional Administrator

Enclosure

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COMMENTS ON DRAFT EIS
MAYO ELECTRIC GENERATING PLANT

A. Water Balance of the Make-up Water Reservoir

Water use information included in the Environmental Report and Draft Environmental Impact Statement appears to have several errors and inconsistencies which could seriously impact the viability of the project. It appears that consumptive water use has been underestimated. This could affect drawdown and water quality in the reservoir and in downstream releases. Items where inconsistencies and possible errors exist include:

1. average flow of Mayo Creek
2. cooling tower evaporative losses (including plant heat rejection rate and expected plant capacity factors)
3. make-up reservoir evaporative losses
4. ash pond evaporative losses
5. ash pond seepage

Average flow at the dam is noted in the Summary Assessment as 44 cfs; however, both the ER and DEIS indicate the average flow of Mayo Creek is 50 cfs. The detailed basis for average flow estimates of Mayo Creek should be provided in the Final EIS since the water balance information may ultimately prove the project to be infeasible.

Evaporative losses from the cooling towers are estimated by CP&L to average 15 cfs. Under maximum load during summer conditions when approximately 90 percent or more of the heat rejected by the cooling towers can be anticipated due to evaporation (10% by conduction and convection), 29 cfs of water would be evaporated if 3.6 billion BTU/hr are dissipated. It is during this period that plant loads are highest and a significant portion of the yearly evaporation will occur.

Monthly average load factors and evaporation losses for each month of the year for average and for critical meteorological conditions are necessary to assess the reasonableness of the water balance and have not been provided. Additionally, the 3.6 billion BTU/hr heat rejection rate corresponds to a 36.5% efficiency factor for the plant which appears high for a coal-fired plant utilizing cooling towers. Decreased efficiency would result in higher rejection rates and correspondingly higher evaporation. CP&L estimates (Table 1.7-1 of the ER) that the maximum annual load factor expected for either unit is 61 percent through 1996. This expected plant utilization is significantly less than historically reported for newer and larger units in the CP&L system and appears even lower for the newest plant in the system (with 36.5 percent efficiency factor). Increased plant usage would result in higher evaporative losses than projected.

Evaporative losses from the make-up water reservoir are not estimated or assessed in the DEIS; however, CP&L estimates (ER Page 6) a net natural evaporation of about two cfs. Evaluation of evaporation rates versus evapotranspiration rates for the Mayo site indicates at least 8.5 inches per year of net natural evaporation will occur (almost three cfs). Forced evaporation due to heat discharged in the cooling tower blowdown (which could be as much as 30°F warmer than the water surface during the winter) would further increase water loss from the reservoir. Similarly, there will be a net natural evaporation from the ash pond and a forced evaporation component due to heat transferred to sluice water by the hot ash. In addition to the evaporative losses, seepage through the bottom of the ash pond and through the ash pond dam (with its 85-foot high normal hydrostatic head) can be expected.

Details and clarification of the above inconsistencies and errors are necessary before a full and independent assessment of the water balance can be made. The water balance presented in the ER and Draft EIS is at best marginal for a viable project and additional losses as indicated above may prove the project to be unacceptable. Detailed reassessment is necessary, therefore, to ascertain if the project is viable. The DEIS assumes a 24 cfs average discharge rate from the

make-up water dam (Page 4-37); however, this value is inconsistent with the expected losses from the facility.

B. Use of Waters of The United States for Ash Disposal

The COE has determined that Crutchfield Branch is waters of the United States (Draft EIS, Summary). Disposal of ash therein would not be allowed by EPA. Since Crutchfield Branch is Waters of The United States, use of the proposed pond for ash disposal would be prohibited. Unless alternate ash disposal could be provided, construction of the entire facility may be prohibited.

C. Ash Handling

It has been proposed that fly ash be pneumatically conveyed to a hopper which would allow sale in a dry form, should a market develop. However, conveyance from the hopper by water sluicing to the ash pond is proposed for excess flyash. Standards of Performance for New Sources as promulgated in October 1974 provided for no discharge of pollutants from flyash handling, based on conclusions in the Development Document that dry flyash handling was available. (See reference.) Although this requirement was remanded as indicated in the DEIS, further evaluation by EPA has indicated that the technology of dry flyash handling is feasible, is not excessively costly, and is being instituted by many power companies now. It is anticipated that dry flyash handling

will be proposed again in the September 1978 revision to the Effluent Guidelines and promulgated again in March 1979. The FEIS should, therefore, assess dry flyash handling and disposal at the Mayo site or of some other system to assure that there is no discharge of pollutants to Waters of The United States from the flyash handling system. Such evaluation is necessary to assure that the project is viable.

Even were dry flyash handling not required at the site by Effluent Guidelines, it appears that sluicing as proposed by the applicant would be unacceptable. Flyash contains numerous heavy metals and other toxic pollutants (including arsenic, chromium, copper, iron, lead, mercury, nickel, selenium, vanadium and zinc) which are leachable by sluicing water. Other than a projection that selenium might be present at 0.03 mg/l, no other projections are made of expected heavy metal concentrations. This appears to be due to the unavailability of data from an ash pond in the CP&L system or other nearby systems which receive flyash from coal with the extremely low sulfur content proposed for the Mayo plant. Based on the evaporative losses included in the comments on the make-up reservoir water balance and concentration and reconcentration of pollutants naturally present in the Mayo Creek drainage flow and leached from sluiced ash, toxic concentrations (chronic and potentially accute) can be anticipated to be present in the make-up reservoir and

its releases and in seepage through the ash pond dam. Both Mayo Creek and Crutchfield Branch are interstate streams and both appear to be used for livestock watering. The reservoir itself has been proposed as supporting a viable sport fishery. None of these uses is consistent with the existence of either chronic or accutely toxic concentrations of heavy metals. Since presence of such pollutants in toxic concentration cannot be allowed, assurance that acceptable concentrations will exist must be provided or the project will be deemed environmentally unacceptable. It is, therefore, recommended that samples of the proposed coal be obtained and burned and that leaching tests be performed to determine the concentrations of metals which could be expected. Heavy metal analysis should be conducted on the coal and ash so that projections of long-term leaching effects of heavy metal concentrations can be made. As an alternate, dry fly ash handling and disposal systems could be used at the plant. Performance standards for New Sources are predicated on use of a recycled bottom ash sluicing system; however, a once-through system is proposed by CP&L. No information is presented by CP&L to assure that the system proposed is equivalent in treatment efficiency to that provided by the Development Document. Such an assessment is necessary to assure that the project is viable as proposed. To assure

that the project is viable, CP&L should re-evaluate the proposed ash handling systems and provide a commitment to dry flyash handling and disposal and to a bottom ash handling system which recycles sluice water for ash transport.

D. Discharge Systems

No information is presented on the discharge systems for the cooling tower blowdown or ash pond discharge to the make-up water reservoir or on the required mixing zone necessary to assure conformance with North Carolina Water Quality Standards for heat and other pollutants. Such an assessment is necessary to assure that the project is viable. Assertion by the applicant that he will be able to meet applicable requirements is inadequate.

E. Cooling System Treatments

Effluent guidelines allow discharge of free available chlorine at a maximum concentration of 0.5 mg/l and an average concentration of 0.2 mg/l, but do not allow discharge of total residual chlorine (TRC) for more than two hours per day. Since the applicant proposes continuous discharge of blowdown and since TRC can be expected to remain in the cooling tower system and blowdown for most, if not all, of twenty-four hour period following chlorination, extremely low concentrations of TRC will be necessary to assure that chronic conditions

do not exist in the vicinity of the discharge to the reservoir. EPA has determined that concentrations of no more than 0.01 mg/l of TRC are necessary to protect warm water fish and fish food organisms for continuous discharges. In addition, since technology exists for dechlorination, it is anticipated that EPA will propose the effluent limitation for chlorine discharges from power plants as non-detectable. CP&L should, therefore, evaluate dechlorination systems or alternate biocides and such assessment and commitment to such systems be provided in the FES.

CP&L proposes addition of corrosion inhibitors to the cooling towers but does not indicate what compounds will be used or in what concentrations. CP&L further postulates that no detectable amount of inhibitor will be present in the blowdown. Since continuous discharge of blowdown is proposed, and since concentrations of corrosion inhibitors far exceeding detectable concentrations are necessary to protect against corrosion unless corrosion resistant materials are used -- in which case use of corrosion inhibitors would be unnecessary -- clarification and details are necessary in the FEIS.

F. Cooling Tower Blowdown

Cooling tower design parameters include a 78°F wet bulb temperature. This value is exceeded 2-1/2 percent of the time during the summer months and during such time blowdown

temperatures will exceed design values. Expected maximum instantaneous and maximum 24-hour average discharge temperatures should be provided in the FEIS. No basis for the monthly average discharge temperatures included in the DEIS are provided, i.e., are they estimates or based on design curves for cooling towers already selected for the site? Are they based on maximum load factor or average expected for the month, etc.? Cooling tower blowdown is noted as probably being in the range of 4 to 8 MGD (FEIS Page 1-12); however, the NPDES application indicates that blowdown will be 21.0 MGD. This increase in the blowdown and the necessitated increase in make-up water requirements could have significant impact on the aquatic organisms subject to entrainment and impingement. Re-evaluation of these impacts is, therefore, necessary.

G. Intake Structure

Inadequate information on the intake system is provided to make an assessment of whether or not the proposed intake structure conforms with the requirements of Section 316(b) of the Federal Water Pollution Control Act, as amended. Location, design, construction and capacity of the cooling water intake structure must reflect the best technology available for minimizing adverse environmental impact.

Details should be provided in the Final EIS. Additionally, a perforated pipe intake with deep submergence away from potentially biologically sensitive areas of the reservoir should be evaluated in the FEIS since environmental impacts of such an intake relative to a conventional shoreline intake would be significantly reduced.

Capacity and number of pumps proposed, as well as maximum and average expected pumping rates, should be provided in the FEIS and environmental impacts of such intake rates addressed in the FEIS. Re-evaluation of the bottom elevation of the intake structure should be made relative to above comments related to the water balance of the reservoir. Intake velocity of 0.5 fps is stated as the design criteria; however, no indication is provided as to what reservoir elevation would correspond to this intake velocity or if maximum drawdown will result in lighter velocities.

Miscellaneous Comments

1. Make-up water reservoir storage capacity as a function of long-term drought and the associated drawdowns appear to have been taken from information provided by the applicant. Independent verification should be made. This is especially necessary in relation to the problems noted in relation to the water balance for the make-up water reservoir.

2. Low flows of Mayo Creek provided in the DEIS are inconsistent. Page 2-3 indicates that the 7-day, 10-year low flow is 0.1 cfs. However, on Page 1-9 it is stated that on a one-in-ten-year frequency no flow would occur for 60 days.

3. On Page 1-9, it is indicated that a release of 2 cfs will be maintained at all times. However, elsewhere in the DEIS, it appears that there may be certain situations when less than 2 cfs will be discharged. Such conditions should be delineated, and the effect of such guaranteed releases on the reservoir drawdown pattern should be re-assessed.

4. A table indicating make-up, blowdown and evaporation losses as a monthly average as well as the maximum values anticipated within each month should be provided in the FEIS so that evaluations of impacts on total evaporation and effects of blowdown and other discharges to the impoundment under various depth conditions can be made.

5. A basis should be provided for the assessment that selenium will be concentrated to no more than 0.009 ppm as a result of ash pond discharge of 0.03 ppm, especially under drought conditions. With stratification, drawdown and reservoir configuration significant portions of the

reservoir volume may not be available for dilution. Likewise, the basis of only 0.03 ppm of selenium being present in the ash pond effluent should be provided.

6. There is no discussion of construction wastes and treatment such as concrete batch plant and washing wastes (high pH and TSS) and pre-operational metal cleaning wastes (high pH, high phosphates, etc.). Such information should be presented in the FEIS.

7. Ash pond flow is noted as 20 cfs (Page 1-13). Of this quantity, 4 cfs is bottom ash transport and 16 cfs is fly ash transport water (per the NPDES application). This flow may exceed the flow resulting from normal inflow less evaporative losses (see comments on reservoir water balance). Such usage will result in increases in dissolved solids and other pollutants present in the runoff and ash pond effluent. Effects of such materials on the cooling tower concentration factor should be specifically discussed in the FEIS. Limiting concentrations of sulfate, chloride, TDS, silica and other pollutants which would affect the concentration factor(s) of the cooling towers should be provided in the FEIS. Expected maximum, minimum and average concentration factor for average conditions and for critical drawdown periods should be provided in the FEIS.

8. Discussion of Standards of Performance for New Sources (effluent limitations) are inadequate. The terms "average" and "daily maximum" as used should be defined as 30-day average (average) and 24-hour average (daily maximum). All limitations are quantity limited (mg/l x flow). Bottom ash transport water limitations are not 1.5 mg/l and 5.0 mg/l as stated, but in fact are based on 30 and 100 mg/l and a recirculated bottom ash system with 5 percent blowdown. Inclusion of the attached Table in the FEIS is suggested for clarity.

9. No discussion is provided of proposed treatment of water wash metal cleaning wastes (air preheater, boiler fireside, etc.). These wastes are subject to the same effluent limitations as boiler acid cleaning wastes.

10. No discharge of polychlorinated biphenyl compounds is permitted. If PCB containing equipment is to be present on site, preventative measures proposed to prevent discharge of PCB's should be presented in the FEIS.

11. Air Quality

Presentation of CP&L monitoring data appears adequate, but what was the means of determining prevailing winds at the Raleigh-Durham Airport on a given day? If it was a printed summary issued by the weather bureau, it might help to have

this included in the FEIS. It would also be helpful to know if the company has firm contracts for the low-sulfur coal it will need for continued compliance with SO₂ emission limits. Is this addressed in the supplement on SO₂ emissions?

REFERENCES AND SHORT TITLES USED

1. "Summary Assessment": Carolina Power & Light Company, "Mayo Electric Generating Plant, Summary Assessment of Environmental Data and Programs," April, 1977.
2. "Environmental Report": Carolina Power & Light Company, "Mayo Electric Generating Plant Environmental Report," June, 1977.
3. "Draft EIS or DEIS": U. S. Army Corps of Engineers, Wilmington, North Carolina, "Draft Environmental Impact Statement, Carolina Power and Light Company, Mayo Electric Generating Plant," May, 1978.
4. "Development Document": U.S. Environmental Protection Agency, "Development Document for Effluent Limitations Guidelines and New Source Performance Standards for the Steam Electric Power Generating Point Source Category," October, 1974.
5. "Final EIS or FEIS": U.S. Army Corps of Engineers, Wilmington, North Carolina, "Final Environmental Impact Statement, Carolina Power & Light Company, Mayo Electric Generating Plant," to be published.